



N-terminal domain truncated telomerase

ATGCCGCGCGCTCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTGCCGTGGCCACGTTCTGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCCTGGGGCCCCAGGGCTGGCGGCTGGTGACGCGGGGACCCGGCGGCTTTCCGCGCGCTGGTGGCCAGTGCCCTGGTGTGCGTGCCCTGGGACGACGGCCGCCCCCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCCCTCTTCGCGCAGGTGTCTGCTGAAGGAGCTGGTGGCCGAGTGCTGACAGGGCTGTGCGAGCGCGCGCGGAAGAACGTGTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTCACCAACGAGCGTGGCGAGCTACTTGCCCAACCGTGACCGCAGCTGCGGGGAGCGGGGCGTGGGGCTGCTGCTGCGCGCTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTCACCTGCTGGCAGCTGCGCGCTCTTTGTGCTGGTGGCTCCGAGCTGCGCTACCAAGTGTGCGGGCGCGCTGTACCACTGCGCGCTGCCACTCAGGCCCCCGCCCCCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCCGAAGGCTCTGGGATGCGAACGGGCTGGAACCATAGCGTCAGGAGGGCGGGGTCCCGCTGGGCGCTGCAGCCCCGGGTGCGAGGAGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTGCGGTGCGCAAGAGGCGCAGGCGTGGCGCTGCCCCGTAGCGCGAGCGGACGCCCGTGGGCGAGGGTCTGGGCGCACCCCGGCGAGGACGCGTGGACCGAGTGACCG
S R S L P L P R R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGTGTGTACCTGCCAGACCCGCGAAGAAGCCACCTCTTTGGAGGGTGGCTCTCTGCGACGCGCACTCCACCCATCCGTGGGCGCGCAGCACCAGCGGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCGACCCAGCTCCCTGGGACACGCTTGTCCCCGGTGTACCGCGAGACCAAGCACTTCCTCTACTCTCAGGCGACAAGGAGCAGCTGCGGCCCTCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCGCAGCTGACTGGCGCTCGGAGGCTCGTGGAGACCATCTTTCTGGTTTCAGGCGCTGGATGCCAGGGACTCCCGCAGGTTGCCCCGCTGCCCGAGCGCTACTGGCA
S L R P S L T G A R R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGCCCCCTGTTTCTGGAGCTGTCTGGGAACACGCGAGTGCCCTACGGGGTGTCTCTCAAGACGCACTGCCCGCTGCGAGCTGCGGTCACCCCAGCAGCGGTGTCTGTGCCCCG
M R P L P L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTCTGTGGCGGCCCCCGAGGAGGAGACAGACCCCGCTGCGCTGGTGGAGCTGCTCCGCGAGCACAGCAGCCCCCTGGCAGGTGTACGGCTTCGTGCGGGCCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCCCGGCTGGTGGCCCCAGGCTCTGGGGCTCCAGGCACAACGAACGCGCTCTCTCAGGAACACCAAGATTCTCTCCCTGGGAAGCATGCCAAGCTCTGCTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GAGTGGGAAGATGAGCGTGGGAGTGGCTTGGCTGCGCAGGAGCCAGGGTGGCTGTGTTCGGCCGCGAGAGCACCGTCTGCGTGAGGAGATCTGGCCAAGTTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGTGCTGAGCTGCTCAGGTCTTTCTTTATGTACGAGAGCCAGCTTTCAAAGAAGAGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAAGCATTTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F P Y R K S V W S K L Q S I G

AAT - NNN - GACAGTCAACAGGGGGTTGACCGCGGACTGGGCGTCCCCAGGGTGACTATAGGACCAGGTGTCCAGGTGCCCTGCAAGTAGAGGGGCTCTCAGAGGCGTCTGGCTGG
CATGGGTGGACGTGGCCCCGGGATGGCTTCTGCGTGTGCTGCGGTGGGTGCCCTGAGCCCTCACTGAGTCGGTGGGGCTTGTGGCTTCCCGTGAGCTTCCCCCTAGTCTGTGTCTG
GCTGAGCAAGCTCTGAGGGGCTCTCTATTG-

FIG. 11A



Truncated protein 1

ATGCCGCGGCTCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGCAGGCTGCTGCCGCTGGCCACGTTCTGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGCAGCGCGGGACCCGGCGGCTTTCCGCGCGCTGGTGGCCAGTGCCTGGTGTGGTGGCTGGGACGACGGCGCGCCCCCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCCCTCTTCGCCCAGGTGTCTGCTGAAGGAGCTGGTGGCCCGAGTGTGCAGAGGCTGTGGAGCGCGGCGGAAGACGTGCTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACACGAGCTGCGCAGCTACCTGCCCAACACGCTGACCGACGCACTGCGGGGAGCGGGGCGTGGGGGCTGCTGCTGCGCGCGTGGGCGACGAGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGTTTCACTGTGCGCAGCTGCGGCTCTTTGCTGCTGGTGGCTCCAGTGTGCGCTACAGGTGTGCGGGCGCGCGTGTACAGCTGCGGCTGCGCACTCAGGCCCGGGCCCCCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCGAAGGCGTGTGGATGCGAAGCGGCTGGAACCATAGCGTCAGGAGGCGGGGTCCCCCTGGGCTGCGCAGCCCGGGTGGAGGAGCGGGGGCAGTGC
H A S G P R R L G C E R A W N H S V R E A G V P L G L P A P G A R R V G G S A

CAGCGAAGTCTGCGTTCGCCAAGAGCCAGGCGTGGCGCTGCGCTGAGCGGAGCGGACCGCGTGGGCGAGGGTCTGGGCGCACCGGGCAGGACGCTGGACCGAGTGACG
S R S L P L P K R P R G A A F E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGTGTGTCTACCTGCCAGACCCCGAAGAACCTCTTTGAGGGTGGCTCTCTGCGCAGCGCCACTCCACCCATCCGTGGGCGCCAGCACCACGCGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACCGCTCCCTGGGACACGCTTGTCCCCCGGTGTACCGCGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGCAGCTGCGGCGCTCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTCGTGGAGACCATCTTTCTGGGTTCAGGCCCTGGATGCCAGGACTCCCGCAGGTTCGCCCCGCTGCCCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATGCGGCCCTGTCTTCTGGAGCTGTGGGAACACGCGCAGTGGCCCTACGGGGTGTCTCTCAAGACGCACTGCCCGCTGCGAGCTGCGGTACCCAGCAGCGCGGTGTCTGTGCGCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGCTCTGTGGCGGCCCCGAGGAGGAGACACAGACCCCGTGGCTGGTGCAGCTGTCTCGCCAGCACAGCAGCCCTGGCAGGTGTACGGCTTGTGCGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTGGCCCCAGGCTCTGGGGCTCCAGGCACAACGAACGCGCTTCTCAGGAACACCAAGAAGTTCATCTCCCTGGGAAGCATGCCAAGCTCTGCTGCGAGGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGGAAGATGAGCGTGGGGACTGCGCTTGGCTGCGCAGGAGCCAGGGGTGGCTGTGTTCCGGCCGCGAGACACCGTCTGCGTGAGGAGATCCTGGCCAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGTGCTGAGCTGCTCAGGTCTTTCTTTATGTACGGAGACCACTTTCAAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTCAAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

AATCAGACGCACTTGAAGAGGGTGCAGCTGCGGGAGCTGTGGAAGCAGAGGTGAGGAGCATCGGGAAGCCAGGCCCGCTGCTGACGTCCAGACTCCGCTTCATCCCCAAGCGCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

GTGGCTGTGCTTTGGTTTAACTTCCITTTTAAACAGAA
V A V L W F T F L P N Q K

CGGGCTGCGGCCGATTGTGAACATGGACTACGTGCTGGAGCCAGAAGCTTCCGAGAGAAAAGAGGGCCGAGCGTCTCACCTCGAGGGTGAAGGCACTGTTTCAGCGTCTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R P S V S F R G *

FIG. 11B

Truncated protein 2



Altered C-terminus protein

ATGCCGCGCTCCCGCTGCCGAGCGGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTCCGCTGGCCACGTTCTGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCGAGGGCTGGCGGTGGTGACGCGGGGACCGGCGGCTTTCCGCGCTGGTGGCCAGTGCTGGTGTGCGTGGCCCTGGGACGACGGCGCGCCCGCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCTCTTCGCGCAGGTGTCTGCTGAAGGAGCTGGTGGCGGAGTGCTGCGAGCGCTGTGCGAGCGCGGCGAAGAACGTGTGGCTTCGGCTTCGCGCTGCTGGACGGGCGCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGCGCCCCGAGGCTTCACCAACAGCGTGCGCAGCTACCTGCCCAACAGGTGACCGACGCACTGCGGGGAGCGGGCGTGGGGGCTGCTGCTGCGCGCGTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTCACTGCTGGCAGCTGCGCGCTCTTTGTGCTGGTGGCTCCAGCTGCGCTACCAAGTGTGCGGGCGCGCTGTACCACTGCGCGCTGCGCACTCAGCGCCGCGCCCGCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCGAAGCGCTGCGGATGCGAACGGGCTGGAACCATAGCGTCAAGGAGCGGGGTCCCTTGGGCTGCCAGCCCGGGTGGCAGGAGGGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P A R R G G S A

CAGCCGAAGTCTGCGCTGCCAAGAGGCGCGAGCGTGGCGCTGCCCTGAGCGGAGCGGACCGCGTGGGAGGGTCTGGGCGCACCGGGCAGGACGCTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGTGGTGTCACTGCCAGACCCCGGAAGCCACTCTTTGGAGGTGCGCTCTTGGCAGCGCCACTCCACCCATCGTGGGCGCGCAGCAGCGCGGCGCGCGC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGCCACCGCTGCGGACCGCTTGTCCCCCGGTGACCGCGAGACCAAGCACTTCTCTACTCTCAGGCGACAGGAGCAGCTGCGGCGCTCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGCGCCAGCTGACTGGCGCTCGGAGGCTCGTGGAGACCATCTTTCTGGTTCACAGGCGCTGGATGCCAGGAGTCCCGCGAGGTTCGCCCGCTGCCCGCAGCGCTACTGGGA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGCGCCCTGTTCCTGGAGCTGCTTGGGAACACCGCGCAGTCCCTACGGGGTGTCTCAAGAGCACTGCGCGCTGCGAGCTGCGGTCAACCCAGCAGCGCGGTGTCTGCGCGC
M R P L L G L L G N H A Q C P Y G V L K H C P L R A A V T G A R C A R

GGAGAAGCCCGAGGCTGTGTGGCGGCGCGGAGGAGGACACAGACCCCGTCCGCTGGTGCAGCTGCTCCGCGCAGCAGCAGCGCTGGCAGGTGTACGGCTGTGTGCGGCGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGCGTGGTGGCGCGCGCTGCGGCGCTCCAGGCACAAAGCGCGCTCTCTCAGGAACACCAAGAGTTCATCTCCCTGGGGAAGCATGCAAGCTCTGCTGCGAGGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGAAGATGAGCGTGGCGGACTCGCTTGGCTGCGCAGGAGCCCGGGGTGGCTGTGTTCGCGCGCAGAGCAGCTGCTGCGTGAGGAGATCTCGGCCAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A R P A G V L L S

GATGAGTGTGTACGTGCTGAGTGTCTCAGGTCTTTCTTTATGTACCGGAGACCAAGTTCACAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTCACAAAGCATTTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L P F Y R K S V W S K L Q S I G

AATCAGACGCACTTGAAGAGGGTGCAGCTGCGGAGCTGTGGAAGCAGAGGTGAGGAGCAGTCCGGAAGCAGGCGCGCGCTGCTGACGCTCAGACTCCGCTTCATCCCAAGCGCTGA
I R Q H L K L R E L S E A E V R Q H E A R P A L L T S R L P I P K P D

CGGGCTGCGCGCATTTGAACATGGACTACGTGCTGGAGCAGAACGTTCCGAGAGAAAGAGGCGGAGCGTCTCACTCGAGGTTGAAGCACTGTTCAGCGTCTCACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E

GCGGCGCGCGCGCGCGCGCTCTGCGCGCTGCTGCTGGGCTGACGATATCCACAGGCGCTGGGCGACCTTCGTGCTGCTGCTGGGCGCGCAGGACCCGCGCGCTGAGCTGTACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTCAAGTGGATGTGACGGGCGGTACGACCATCCCCAGGACAGGCTCAGGAGTTCATCGGCAGTATCAAAACCCAGAACCGTACTGCGTGGTGGTATGCGGTGCTGCA
V K V D V T G A Y D T I P Q D R L T E V I A S I I K P Q N T Y C G R T P A A V V Q

GAAGCGCGCATGGGACGTCGCGCAAGCGCTCAAGAGCCAGTCTCTACCTTGACAGACCTCCAGCGGTACATGCGACAGTTCGTGGCTCACTGCGAGGAGCAGCGCGCTGAGGGA
K A A H G H V R K A P K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCCGTGCTCATGAGCAGAGCTCTCTCTGAATGAGGCGCAGTGGCTCTTCGACGTCTCTCTACGCTTCATGTGCCACCAAGCGCGTGGCAGCAGGCGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGGATCCCGAGGCTCCATCTCTCCAGCTGCTGCGAGCGTGTACGCGACATGGAGAACAAGCTGTTTGGGGGATTGCGGGGAGCGGCTGCTCTCGTGTGGTGGGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTGTGTGACACCTCACCTACCCAGCGGAAACCTTCTCAGGACCTTGGTCCGAGGTGTCCTGAGTATGGCTGCGTGGTGAAGTTCGCGGAAGACAGTGGTGAACCTCCG
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGACGAGGCGCTGGTGGCAGCGCTTTGTTTCAGATGCGGCGCGCGCTATCCCTGGTGGCGCTGCTGCTGGATACCGGAGCCCTGGAGGTGCGAGGAGCTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q A D Y S S

CTATGCCCGGACCTCCATCAGAGCAGTCTCACCTTCAACCGCGGCTTCAAGGCTGGGAGGAACATCGCTCGCAAACTCTTTGGGGTCTTGGCGGTGAAGTGTACAGCGTGTCTTCTGGA
Y A R T S I R A S L T F N R G P K A G R N M R R K L F G V L R L K C H S L F L D

TTTGAGGTGAACAGCGCTCCAGACGGTGTGACCAACATCTACAAGATCTCTCTGCGAGCGGTACAGGTTTACGCGATGTGTGCTGAGCTCCCATTTTCAGCAAGTTTGAAGAA
L Q V N S L Q T V C T N I Y K I L L L Q A Y R F H A C V L Q L P F H Q Q V W K N

CCCCACATTTTCTGCGGTCTCTGACACGGCTCTCTCTACTCTCATCTGAAAGCAAGAACGAGGATGTGCTGGGGGCAAGGGCGCGCGCGCTCTGCGCTCCGA
P T F F L R V I S D T A S L C Y S I L K A K N A E

CCGAAGAAACATTTCTGTGCTGACTCTGCGGTGCTGGGTC
E E N I L V V T P A V L G S

GGGACAGCCAGAGATGGAGCCACCCGAGACCGTGGGTGTGGGAGCTTTCCGCTGTCTCTGGGAGGGAGTGGGCTGGGCTGAGTCTCTCAGCTCTGTTTTTCCCCAG
G Q P E M E P P R R P S G V G S F P V S P G R G V G L G L *

FIG. 11H



Lacks motif A and altered C-terminus

ATGCCGCGCGCTCCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAGTGCTGCCGCTGGCCACGTTCTGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T P V

CGGCGCTGGGGCCCCAGGGTGGCGGCTGGTGCAGCGCGGGACCGCGCGCTTCCGCGCGCTGGTGGCCAGTGCTGGTGTGCTGCTGGGACGACGGCGCGCCCCCGCGCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCCCTCTTCGCCAGGTGTCTGCTGAAGAGCTGGTGGCGCGAGTGTGTCAGAGGCTGTGTCAGCGCGCGCGAAGAACGTGCTGGCCTTCGGCTTCGCGCTGTGGACGGGGCGCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTCCACCAAGCGTGGCGAGTACCTGCCCAACAGGTGACCGACGCACTGCGGGGAGCGGGCGTGGGGCTGCTGCTGCGCGCGTGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTCACCTGCTGGCAGCTGCGCGCTCTTTGCTGCTGGTCTCCAGCTGCGCTACCAAGTGTGCGGGCGCGCTGTACAGCTGCGCGCTGCCACTCAGCGCGCGCGCGCGCG
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCGAGGCGTCTGGGATGGGAACGGGCTGGAACCATAGCGTCAGGAGGCGCGGGTCCCGCTGGGCTGCGAGCCCGGGTGGCGAGGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R V G S A

CAGCGAAGTCTGCGTGTGCCAAGAGGCGCGAGGCTGCGCTGCCCTGAGCGAGCGGACGCCGCTGGGAGGGTCTGGGCGCACCGGGCAGGACGCTGGACGAGTACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGTGTGTGCTACCTGCCAGACCCCGAAGAACCTCTTTGAGGGTGCCTCTCTGCGACGCGCCACTCCACCCATCCGTTGGGCGCGAGCACCGCGGGCGCGCG
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACCGCTCCCTGGGACACGCTTGTCCCCCGGTGTACCGGAGACCAAGCACTTCTCTACTCTCAGCGGACAGGAGCAGCTGCGGCGCTCTCTCTACTACTC
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S P L L S

CTCTCTGAGCGCCAGCCTGACTGGCGCTCGGAGGCTCGTGGAGACCATCTTTCTGGGTTCAGGCGCTGATGCCAGGACTCCCGCAGGTGTGCCCGCGCTGCCCGAGCGTACTGGGA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGCGCGCTGTCTTCTGAGCTGCTTGGGAACACGCGCAGTGCCTTACGGGGTCTCTCAAGAGCACTGCGCGCTGCGAGCTGCGGTCAACCCAGCAGCGGGTGTCTGCGCG
M R P L F L L G N H A Q C P Y G V L K H C P L R A A V T G C A R

GGAGAAGCCCGAGGCTGTGTGGCGCGCGCGAGGAGGACACAGACCCCGTGCCTGTGTGAGCTGTCTCCGCGACACAGCAGCCCTGGCAGGTGTACGGCTGTGTGCGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGCGTGTGTGCCCGAGGCTTGGGGCTCCAGGCAACAGCAACCGCGCTTCTCAGGAACACCAAGAGTTCATCTCCCTGGGAAGCATGCGAAGTCTCTGCTGCGAGGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGGAAGATGAGCGTGGGAGTGGCTTGGCTGCGCAGGAGCGCGGGTGGCTGTGTTCGCGCGCAGAGCACCGTCTGCGTGAGGAGATCTGCGCAAGTCTGCTGCACTGGT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGTGCTGAGCTGCTCAGGTCTTTCTTTATGTACGAGACCAAGTTCCTCAAGAGCAAGGCTCTTTTCTACCGAAGAGTGTCTGGAGCAAGTTCAGCAAGCATGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L P F Y R K S V W S K L Q S I G

AATCAGACGCACTTGAAGAGGCTGAGCTGCGGAGCTGTGGAAGCAGAGGTGAGGAGCAGTCCGGAAGCAGGCGCGCGCTGCTGAGCTCCAGCTTCCGCTTCATCCCAAGCGCTGA
I R Q H L F L R E L S E A E V R G E A R P A L L T S R L R F I P K P D

CGGGCTGCGCGCGATTTGAACTGGAAGTACGTGCTGGAGCGAGAGCTTCCGAGAGAAAGAGGCGAGCGTCTCACTGAGGGTGAAGGCACTGTTCAGCGTGTCTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E

GCGGGCGCGCGCGCGCGCTCTGCGCGCTGTGTGCTGGGCTGAGCATATCCAGGGGCTGGCGCACCTTCGTGCTGCGTGTGCGGGCGCGAGCACCGCGCGCTGAGCTGTACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTCAAG
V K

GACAGGCTCAGGAGGTCTGCGCAGCATCAAAACCCAGAACAGTACTGCGTGGTGGTATGCGGTGCTCA
D R L T E V I A S I I K P Q N T Y C V R Y A V V Q

GAAGCGCGCCCATGGGACGTCGCGAAGGCTTCAAGAGCCAGTCTCTACCTTGACAGACCTCCAGCGGTACATGCGACAGTTCGTGGCTCACCTGCAGGAGACCGCGCGCTGAGGGA
K A A H G H V R K A P K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCGGTGCTCATGAGCAGAGCTCTCCCTGAATGAGGCGAGCAGTGGCTCTTCGAGCTTCTCTACGCTTCATGTGCCACCGCGGTGCGCATCAGGGGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGGATCCCGAGGCTCCATCTCTCCAGCTGCTCTGAGCCTGTGTACGCGACATGGAGAACAGCTGTTTGGGGGATTGCGGGGAGCGGGCTGCTCTGCTGTTGGTGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTGTGTGACACTCACCTCACCGCGAAACCTTCTCAGGACCTGCTCGAGGTTGCTCCGTGATGGTGGTGGTGAAGTTCGGAAGACAGTGGTGAAGTTCGC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGCAGAGGCGCTGGTGGCAGCGCTTTTGTTCAGATGCGCGCGCGGCTTCCCTGGTGGCGCTGCTGCTGGATACCGGAGCCCTGGAGGTGAGAGCGACTCTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V G S D Y S S

CTATGCCCGGACCTCCATCAGAGCAGTCTACCTTCAACCGCGGCTTCAAGGCTGGGAGGAACATGCGTGCAGAACTCTTTGGGGTCTTGGGCTGAAGTGTACAGGCTGTTTCTGGA
Y A R T S I R A S L T F N R G F K A G R N M R R K L F G V L R L K C H S L P L D

TTTGCAGTGAACAGCCTCAGACGGTGTGCACCAATCTACAAGATCTCTGCTGAGCGGTACAGGTTTCAAGCATGTGTGCTGAGCTCCCATTTTCATCAGCAAGTTTGAAGAA
L Q V N S L Q T V C T N I Y K I L L L Q A Y R F H A C V L Q L P P H Q Q V W K N

CCCCACATTTTCTGCGGCTCATCTGTACACGGCTCCCTCTGCTACTTCCATCTGAAAGCAAGAACGAGGATGTGCTGGGGGCAAGGCGCGCGCGCGCTCTGCGCTCCGA
P T F F L R V I S D T A S L C Y S I L K A K N A E

CCGAAGAAACATTTCTGTGCTGACTCTGCGGTGCTTGGGTC
E E N I L V V T P A V L G S

GGGACAGCCAGAGATGGAGCCACCCGAGACCGTGGGTGTGGGAGCTTTCCGGTGTCTCTGGGAGGAGTGGGCTGGGCTGTGACTCTCAGCTCTGTTTCCCCCAG
G Q P E M E P P R R P S G V G S F P V S P G R G V G L G L *

FIG. 11K



N-terminal domain truncated telomerase (ver. 2)

ATGCCGCGCGCTCCCGCTGCCGAGCCGTGGCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTGCGCTGGCCACGTTCTGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V
CGGCGCTGGGGCCCCAGGGCTGGCGCTGTGTCAGCGCGGGGACCCGGCGGCTTTCCGCGCGCTGGTGGCCAGTGCCTGGTGTGCTGCGCTGGGACGCGCGGCCCGCCCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A
GGCCTCCCGGGGTCCGCGCTCCGCTGGGGTTGAGGGCGCGCGGGGGAACAGCGACATGCCGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCGCGCAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V
CCCCCTCTCCCGCAGGTGTCTGCTGAAGGAGCTGTGGCCCGAGTGTGTCAGAGGCTGTGCGAGCGCGCGCGAAGAACGTGCTGGCCTTCGGCTTCGCGCTGTGGAGGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R
CGGGGCCCCCGGAGGCTTACCACCGAGCTGCGCAGCTACCTGCCAACACGCGTACCGAGCGCACTGCGGGGAGCGGGGCGTGGGGGCTGCTGCTGCGCGCGTGGGCGACGAGCT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V
GCTGGTTACCTGCTGCGCAGCTGCGCGCTCTTTGTGCTGGTGGCTCCAGCTGCGCTACCAAGTGTGCGGGCGCGCGCTGTACAGCTGCGCGCTGCGACTCAGGCCCGGCCCGCC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P
ACACGCTAGTGGACCCGAGGCGTCTGGATGCGAACGGGCTGGAACATAGCGTACGAGGAGCGGGGTCCCGCTGGGCTGCGCAGCCCCGGGTGCGAGGAGCGGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A
CAGCGGAAGTCTGCGCTGCCAACGAGGCCAGGCGTGGCGCTGCCCTGAGCGGAGCGGACCGCGTGGGCGAGGCTCTGGGCGCCACCGGGCAGGACGCTGGACGAGTGAACG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R
TGGTTCTGTGGTGTGCTGCTGCGCAGACCGCGAAGAACGACCTCTTTGAGGGTGGCTCTCTGCGACGCGCCACTCCACCCATCCGTTGGGCGCGCAGCACCGCGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P
ATCCACATCGCGGCCACCGCTCCCTGGGACACGCTTGTCCCCCGGTGTACGCGGAGACCAAGCACTTCCTCTACTCTCAGGCGACAAGGAGCAGCTGCGGGCCCTCCTTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S
CTCTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTCGTGGAGACCATCTTTCTGGGTTCCAGGCGCTGGATGCCAGGACTCCCGCAGGTTGCCCGGCTGCCCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q
AATGGGCGCCCTGTTTCTGGAGCTGCTTGGGAACACGCGCAGTGCCTTACGGGGTGTCTCTCAAGACGCACTGCCCGCTGCGAGCTGCGGTACCCAGCAGCGCGTGTCTGTGCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R
GGAGAAGCCCGAGGCTCTGTGGCGGCCCCGAGGAGGAGACACAGACCCCGTCCGCTGGTGCAGCTGCTCCGCCAGCACAGCAGCCCTGGCAGGTGTACGGCTTCTGTGGGCGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C
CCTGCGCGGCTGGTGGCCCCAGGCTCTGGGGTCCAGGCACAAAGAACGCGCTTCTCAGGAACACCAAGAGTTCATCTCCCTGGGGAAGCATGCCAAGCTCTCGTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L
GACGTGGAAGATGAGCGTGGGAGTGGCTTGGTGGCAGGAGCCAGGGGTGGCTGTGTTCCGGCGCGCAGGACCCGTCTGCGTGAGGAGATCCTGGCCAAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L
GATGAGTGTGACGTGCTGAGCTGCTCAGGTCTTTCTTTATGTACGGAGACACGTTTCAAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTCAAAGCATTTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G
AAT--NNN--GACAGTCACAGGGGGTTGACCGCGGACTGGGCGTCCCGGGTGTACTATAGGACAGGTGTCCAGGTGCCCTGCAAGTAGAGGGCTCTCAGAGGCGTCTGGCTG
CATGGGTGGACGTGGCCCCGGGATGGCTTCTGCGTGTGCTGCGTGGGTGCCCTGAGCCCTCACTGAGTGGTGGGGCTTGTGGCTTCCCGTGAAGTTCCTCTAGTCTGTGTCTG
GCTGAGCAAGCCTCTGAGGGCTCTCTATTG.

FIG. 11L



Truncated protein 1 (ver. 2)

ATGCCGCGCGCTCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTGCCGTGGCCACGTTCGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V
CGGCGCTGGGGCCCCAGGGCTGGCGGTGCTGCGAGCCGGGACCCGGCGGCTTTCCGCGCGCTGGTGGCCAGTGCCTGGTGGTGGTGGCTGGGACGCGAGCGCGCGCGCGCGCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A
GGCCTCCCGGGTCCGGCTCCGGTGGGGTTGAGGGCGCGCGGGGGAACAGCGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCCCGCAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G R G E P A T C G E Q R R R L R A L P P Q V
CCCCCTCTCCGCGAGGTGCTGCTGCTGAAGGAGCTGGTGGCCCGAGTGTGCTGAGAGGCTGTGCGAGCGCGCGCGAAGAACGTGCTGGCCTTCGGCTTCGCGCTGCTGGACGGGCGCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R
CGGGGCCCCCGAGGCTTACCACCGAGCTGCGCAGCTACCTGCCAACACGGTGACCGAGCAGTGCAGGGGAGCGGGCGTGGGGCTGCTGCTGCGCGCGTGGGCGAGCAGCT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V
GCTGGTTCACCTGCTGGCAGCTGCGCGCTCTTTGTGCTGGTGGCTCCAGCTGCGCTACAGGTGTGCGGGCGCGCGTGTACAGCTGCGCGCTGCGCACTCAGGCGCGCGCGCGCGCG
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P
ACAGCTAGTGGACCCGAGGCGTTCGGATGCGAACGGGCGTGAACATAGCGTACGGGAGCGCGGGTCCCTTGGGCTGCGAGCCCCGGTGGGAGGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A
CAGCGAAGTCTGCGCTTCCCAAGAGCGCGAGCGTGGCGCTGCCCTGAGCGGAGCGGACCGCGTGGGCGAGGGTCTGGGCGCACCGGGGCGAGCGGTGGACCGAGTACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R V G P S D R
TGGTTCTCTGTGTGTGCTACCTGCGCAGACCGCGGAAGCCACTCTTTGGAGGGTGGCTCTCTGCGCAGCGCGCTCCACCCATCCGTGGGCGCGCAGCACCGCGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P
ATCCACATGCGCGCCACCGCTCCCTGGACACCGCTTGTCCCCCGGTGTACCGGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGCAGCTGCGGCGCTCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S
CTCTCTGAGGCCAGCCTGACTGCGCTCGAGGCTCGTGGAGACCATCTTTCTGGGTTCAGGCGCTGATGCGAGGACTCCCCGAGGTGCGCGCTGCGCGAGCGCTACTGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q
AATGCGGCCCTGTTCTGAGGTGCTTGGGAACACCGCGAGTGCCTACGGGGTGTCTCTCAAGAGCACTGCGCGCTGCGAGTGCCTGCGCGAGCGCGGTGTCTGTCCCG
M R P L P L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R
GGAGAAGCCCCAGGCTCTGTGGCGGCCCCGAGGAGGAGACACAGACCCCGTCCGCTGGTGCAGCTGCTCCGCGACACAGCAGCGCTTGGCAGGTGTACGGCTTGTGTGGGCGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C
CCTGCGCGGCTGGTGCCTCCAGGCTCTGGGGCTCCAGGACACAGAAACGCGCTTCTCAGGAACACCAAGAGTTATCTCTCCGGAAGCATGGCAAGCTCTCGCTGCGAGGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L
GACGTGAAGATGAGCGTGGGAGTGGCTTGGCTGCGCAGGAGCCAGGGGTGGCTGTGTTCGGCGCGAGACCGCTGCGTGGAGAGATCTGGCCAAAGTTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L
GATGAGTGTGTACGTCTGAGCTGCTCAGGTCTTTCTTTATGTACCGGAGACCACTTTCAAAGAACAGGCTCTTTTCTACCGAAGAGTGTCTGGAGCAAGTTGAAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L P F Y R K S V W S K L Q S I G
AATCAGACAGCACTTGAAGAGGTGCGCTGCGGAGCTGTGCGAAGCAGAGTTCAGGAGCATCGGGAAGCCAGGCGCGCTGCTGAGCTGCGAGCTCGGCTTCATCCCAAGCGCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D
GTGGCTGTGCTTTGGTTTAACCTTCTTTTAACAGAA
V A V L W F T F L F N Q K
CGGGCTGCGCGGATTTGTGAACATGGACTACGTGCTGGGAGCCAGAACGTTCCGAGAGAAAAGGGCGGAGCGTCTCACCTCGAGGGTGAAGGCACCTGTTACGCGTCTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R P S V S F R G *

FIG. 11M



Truncated protein 2 (ver. 2)

ATGCCGCGCGCTCCCGCTGCCGAGCGGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTCCGCTGGCCACGTTCTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGCCCCAGGGCTGGCGGTGGTGCAGCGCGGGACCGCGCGCTTTCGCGCGCTGGTGGCCAGTGCTGGTGTGCGCTGGGACGACGGCGCGCCCCCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCCTCCCGGGGTGCGCTCCCGCTGGGCTTGGGGCGCGCGGGGGAACAGCGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCGCGAGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCCCTCTCCCGCAGGTGCTGCTGAAGGAGCTGGTGGCCGAGTGCTGCAGAGGCTGTGCGAGCGCGCGCGAAGAACGTCGCTGGCCTTCGGCTTCGCGCTGCTGGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G P A L L D G A R

CGGGGCCCCCGAGGCTTACCACCGCTGCGCAGCTACCTGCCAACACGCGTACCGACGCACTGCGGGGAGCGGGGCTGGGGCTGCTGCTGCGCGCTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGTTACCTGCTGGCAGCTGCGCGCTCTTGTGCTGGTGGCTCCAGCTGCGCTACAGGTGTGCGGGCGCGCTGTACAGCTGCGCGCTGCGCACTCAGGCGCGCGCGCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGACCCGAGGCGCTGGGATGCGAACCGGCTGGAAACATACGCTGAGGAGCGCGGGTCCCGCTGGGCTGCGAGCCCGGCTGGAGGAGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTGCGCTGCCAAGAGGCGCGAGGCTGCGCTGCCCTGAGCGGAGCGGACGCCCGTGGGCGAGGCTCTGGGCGCGCGCGCGGCGAGCGCTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGTGTGCTACCTGCGAGACCGCGCGAAGAGCCACTCTTGGAGGCTGCGCTCTGCGACGCGCCACTCCACCCATCCGTGGGCGCGCGAGCACCAGCGGGCCCCC
G P C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R L P R L P R L A G Y W Q

ATCCACATCGCGGCGACCGCTCCCTGGGACACGCTTGTCCCGCGGTGACCGGAGACCAAGCACTCTCTCTACTCTCAGGCGACAAGGAGCAGCTGCGGCGCTCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S P L L S

CTCTCTGAGCGCGAGCTGCTGCGGCTGGGAGCTGCTGGAGACCATCTTCTGGGTTCAGGCGCTGGATGCGAGGACTCCCGCGAGTTGCGCGCTGCGCGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P R L A G Y W Q

AATGCGGCGCTGTTTCTGAGCTGCTTGGAAACACGCGCAGTGCCTACGCGGTGCTCTCAAGAGCACTGCGCGCTGCGAGCTGCGGTACCCGAGCAGCGCGGTCTGTGCGCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCGCGCGCTGCTGCGCGCGCGCGAGGAGGAGACAGACCCCGTCCGCTGGTGCAGCTGCTCGCGCAGCAGCAGCGCGCTGCGAGGTGTACGCGCTGCTGCGCGCGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGCGCTGCTGCGCGCGCGCGCTGCGGCTCCAGGCAACAAGACCGCGCTCTCTCAGGAACACCAAGAGTTATCTCCCTGGGAAGCATGCGAAGCTCTGCTGCGAGGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A L P R L P R L A G Y W Q

GACGTGAAGATGAGCGTGGGAGCTGCGCTTGGCTGCGCAGGAGCGCGGGGTGGCTGTGTTCCGGCGCGAGGACCGCTGCGCTGAGGAGATCTGCGCAAGTTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGACGTGCTGAGCTGCTCAGTCTCTTTTATGTACGAGACACGCTTCAAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTGCTGAGCAAGTTGCAAGCATGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F P Y R K S V W S K L Q S I G

AATCAGACGCACTTGAAGAGGTTGCGAGCTGCGGAGCTGTGCGAAGCAGAGGTGAGGAGCATCGGGAAGCGCGCGCGCTGCTGAGCTGCGAGCTTCTGCTTCAATCCCAAGCGTGA
I R Q H L K R R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R P I P K P D

CGGGCTGCGCGCGATTGTGAACATGGAATACGTGCTGGGAGCGAGAACGTTCCGAGAGAAAAGAGGCGCGAGCTCTACCTCGAGGTTGAAGGCACTGTTACGCGTCTCAATACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E

GCGGCGCGCGCGCGCGCTCTGCGCGCGCTGCTGCTGCGGCTGACGATATCCACAGGCGCTGCGCGACCTTCGTGCTGCGTGTGCGGCGCGAGGACCGCGCGCTGAGCTGTACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTCAAGTGGATGTGACGGGCGGTACGACCATCCCCAGGACAGGCTCAGGAGGTATCGCGAGCATCATCAACCCGAGAACGTAAGTGTGCGTGTGCGGTATGCGGTGGTCCA
V K V D V T G A Y D T I P Q D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q

GAAGCGCGCGCTGCGCAGTCCGAGGCTTCAAGAGCCAC
K A A H G H V R K A F K S H

GTCCTACGTCCAGTG
V L R P V

CCAGGGATCCCGCAGGCTCCATCTCTCCACGCTGCTGCGAGCTGTGCTACGCGACATGGAGAACAGCTGTTGCGGGATTGCGGCGGAGGCTGCTCTGCGTTTGGTGA
P G D P A G L H P L H A A L Q P V L R R H G E Q A V C G D S A G R A A P A F G G

TGATTTCTGTTGGTGACACTCACCTACCCACGCGAAAACCTTCTCAGGACCTGCTCGAGGTGCTCTGATATGCTGCGTGTGAACTTGGCGAAGACAGTGGTGAATCTCC

FIG. 11N



GGACCCTGGGAGCTCTGGGAATTTGGAGTGACCAAAGGTGTGCCCTGTACACAGGCGAGGACCCTGCACCTGGATGGGGGTCCCTGTGGGTCAAATTGGGGGGAGGTGCTGTGGGAGTAA
AATACTGAATATATGAGTTTTTCAGTTTTGA

FIG. 11U

FIG. 11V



Lacks motif A and altered C-terminus (ver. 2)

ATGCCGCGCGCTCCCGCTGCGGAGCGGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTCCGCTGGCCAGCTTCGTG
M P R A P R C R A V R S L L R S H Y R E V L L P L A T F V
CGGCGCGTGGGGCCCCAGGGCTGGCGGCTGGTGCAGCGCGGGACCGGGCGGCTTCCGCGCGCTGGGCCAGTGCTGGTGGTGGTGGCGCTGGGACGACGGCGCGCCCCCGCGCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A
GGCCTCCCGGGTTCGGCTCCGCTGGGTTGAGGGCGGGCGGGGGAACAGCGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCGCGAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G R G E P A T C G E Q R R R L R A L P P Q V
CCCCCTCTCCGCGAGGTGCTGCTGAAGGAGCTGGTGGCCGAGTGTGTCAGAGGCTGTGCGAGCGCGCGCGAAGAACTGCTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R
CGGGGGCCCCCGAGGCTTCCACACAGCGTGGCGAGTACCTGCCAACACGGTGACGACGACTGCGGGGAGCGGGCGGTGGGGCTGCTGCTGCGCGCGTGGCGAGCAGCT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V
GCTGGTTCACCTGCTGGCAGCTGCGCGCTCTTGTGCTGGTGGCTCCAGCTGCGCTACCGAGTGTGCGGGCGCGCTGTACAGCTGCGCGCTGCGACTCAGCGCGCGCCCCCGCC
L V H L L A R C A L F V L A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P
ACACGCTAGTGAGCCCGAAGGCGTTCGGATGCGAAGCGGCTGGAACATAGCTGAGGAGGCGGGGTCCTGCGGCTGCGAGCCCCGGGTGCGAGGAGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A
CAGCGGAAGTCTGCGCTTCCCAAGAGCGCCAGCGTGGCGCTGCCCTGAGCGGAGCGGACCGCGTGGCGAGGGTCTGGGCGCCACCGCGGAGCAGCGTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R
TGGTTCCTGTGGTGTGCTGCTGCGAGACCGCGAAGAACCACTCTTGGAGGGTGGCTCTTGGCAGCGGCACTCCACCCATCCGTGGGCGCGAGCAGCAGCGGGCCCCC
G P C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P
ATCCACATGCGCGCCACCGCTCCCTGGGACACGCTTGTCCCCCGGTGTAGCCGAGAGCAAGCACTTCTCTACTCTCAGGCGAAGGAGCAGCTGCGCGCCCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P L S
CTCTCTGAGGCCAGCTGACTGCGGCTCGGAGGCTCGTGAGACCACTCTTCTGGGTTCAGGCGCTGATGCGAGGACTCCCGCGAGGTTCGCCCGCTGCGCCGCGCTACTGGCA
S L R P S L V T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q
AATGCGGCGCTGTTCCTGAGAGTGTTCGGAACACGCGCAGTGGCCCTACGGGTGCTCTCAAGAGCACTGCGCGCTGCGAGCTGCGGTACCCAGCAGCGGTGTCTGTGCGCG
M R P L P L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R
GGAGAAGCCCGAGGCTCTGTGGCGGCGCGGAGGAGGAGACAGACCCCGTCCCTGCTGCTGAGCTGCTCCGCGCAGCAGCAGCGCTGCGAGGTGTACGGCTTGTGCGGCGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W P A E H R L R E E I L A K F L P H W L
CCTGCGCGGCTGTGCTCCCGAGGCTTCGGGCTCCAGGCAACAAGACCGCGCTCTCAGGAAACCAAGAGTTTCTCTCCCTGGGGAAGCTGCGAAGCTCTGCTGCGAGGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L
GACGTGGAAGATGAGCGTGGGAGTGGCTGCTGCGCAGGAGCCAGGGGTGCTGCTGCGGCGCAGAGCAGCGTCTGCGTGGAGAGATCTGGCGCAAGTTCTGCTACTGGT
T W K M S L V R D C A W L R R S P G V G T P A A E H R L R E E I L A K F L P H W L
GATGAGTGTGACGTGCTGAGCTGCTGCTTTTATGTACCGAGACCACTTCAAAGAACAGGCTCTTTTCTACCGAAGAGTGTGAGGCAAGTTCAAAGCATTGG
M S V Y V V E L L R S F P Y V T E T T P Q K N R L P F Y R K S V W S K L Q S I G
AATCAGACGACTTGAAGAGGGTGCAGCTGCGGAGCTGTGGAAGCAGAGGTGAGGAGCAGTCCGGAAGCCGCGCGCTGAGCTGAGACTCGCTTCACTCCCAAGCGCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D
CGGGCTCGGCGGATGTGAACATGGAATACGCTGCTGGGAGCCAGAACGTTCCGAGAGAAAGAGGGCGGAGCGTCTCACCTGAGGGTGAAGGCACTGTTGAGCGTCTCACTACGA
Q G I P Q G S V I L S T L L C S L C Y G D M E N K L F A G I R R D G L L R L V D
GCGGCGCGCGCGCGCGCTCTGCGGCGCTCTGCTGCGGCTGAGACGATACCAAGGCGCTGCGGCGCTCTGCTGCTGCTGCTGCGGCGCGGAGCAGCGCGCGCTGAGCTGTACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F
TGTAAG
V K GACAGGCTCACGAGGTATCGCCAGCATCAAAACCCAGAACAGTACTGCTGCGTGGTATGCGGTGCTCA
D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q
GAAGCGCGCCATGGGACGTCGCGAAGGCTTCAAGAGCCAGTCTCTACCTTGACAGACCTCCAGCGTACATGCGAGTTCGTGGCTCACGTCAGGAGACAGCCCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D
TGCGCTGCTATCGAGCAGAGCTCTCCCTGAATGAGGCGAGCAGTGGCTCTCGAGCTTCTCTACGCTTATGTCACCAACGCGGTGCGCATCAGGGCAAGTCTACGTCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C
CCAGGGGATCCCGAGGGTCCATCTCTCCAGCTGCTGCGAGCTGTGCTACGGGACATGGGAAACAAGCTGTTGCGGGATTGCGCGGAGCGGGTGTCTCTGCTGTTGGTGA
Q G I P Q G S V I L S T L L C S L C Y G D M E N K L F A G I R R D G L L R L V D
TGATTCTGTGTGAGACCTCACCTCACCCAGCGAAACCTTCTCAGGACCTGCTGCGAGGTGTCTCTGAGTATGCTGCGTGGTGAACCTGCGGAAGACAGTGGTGAACCTCCG
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P
TGTAAGAGCAGGCGCTGGTGGCAGGCTTGTGTCAGATGCGGCGCCAGCGCTATTCCCTGCTGCGGCTGCTGCTGAGTACCGGACCTGGAGGTGAGAGGACTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S S
CTATGCGCGGAGCTCCATCAGAGCAGTCTACCTTCAACCGCGCTTCAAGGCTGGGAGGAACATGCTGCGAACTCTTGGGGTCTTGGCGTGAAGTGTACAGCGTGTCTGGA
Y A R T S I R A S L T F N R G F K A G R N M R R K L F G V L R L K C H S L F L D
TTTGAGGTGAACAGCTCCAGAGCGTGTGACCAACATCTCAAGATCTCTGCTGCGAGGCTACAGGTTTACGCGATGTGCTGCGAGCTCCCATTTTATCAGCAAGTTTGAAGAA
L Q V N S L Q T V C T N I Y K I L L L Q A Y R F H A C V L Q L P F H Q Q V W K N
CCCCACATTTTCTGCGGCTCATCTGTGACACGGCTCCCTGCTGCTACTCCATCTGAAAGCCAAAGAACGAGGGATGTGCTGGGGCCAAAGGGCGCGCGCGCTGCGCTCCGA
P T P F L R V I S D T A S L C Y S I L K A K N A E
CCGAAGAAACATTTCTGCTGACTCTGCGGTGCTGGGT
E E N I L V V T P A V L G S
GGACAGCCAGAGATGAGGACACCCGCGAGCCGTGCGGTGGGCGAGCTTCCGGTGTCTCTGGGAGGGAGTTGGGCTGGGCTGCTGCTCTCAGCTCTGTTTCCCGCAG
G Q P E M E P P R R P S G V G S F P V S P G R G V G L G L *

FIG. 11W



domain
N-terminal truncated telomerase

ATGCCGCGCGCTCCCGCTGCCGAGCCGCTGCCCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTGCCGCTGGCCACGTTCCGTG
M P R A P R C R A V R S L L R S H A R E V L P L A T F V

CGGCGCCTGGGGCCCCAGGGCTGGCGGCTGGTGACGCGGGGACCCGGCGGCTTTCCGCGCGCTGGTGGCCAGTGCCCTGGTGTGCGTGCCTGGGACGCAAGGCGCGCCCCCGCGCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCTCCTTCCGCGAGGTGCTGCTGAAGGAGCTGGTGGCCGAGTGCTGAGAGGCTGTGCGAGCGCGCGGCGAAGAACGTGCTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCCC
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGCCCCCGAGGCTTACACACGAGCTGCGCAGCTACCTGCCCAACAGGTGACCGACGACTCGGGGGAGCGGGGCTGGGGGCTGCTGCTGCGCGCTGGGCGACGAGCT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTACCTGCTGGCAGCTGCGCGCTCTTTGCTGCTGGTGGCTCCCACTGCGGCTACCAAGTGCTGCGCGCGCGCTGTACCAGCTCGGCGCTCGGCGCTCGGCGCGCCCCCGCG
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACAGCTAGTGGACCCGAGGCGTGGGATGCGAAGCGGCTGGAACCATAGCGTCAGGAGCGCGGGTCCCCCTGGGCTGCCAGCCCCGGTGCGAGGAGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R R G G S A

CAGCGAAGTCTGCGTGGCCCAAGAGCGCGGCTGGCGCTGCCCTGAGCGGAGCGGACGCGCGTGGGCGGAGGCTGCGGCGGCGGCGGAGCGCGTGGACGAGTGAACG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTCTGCTGGTGTCACTGCGAGACCGCGGCGAAGACCACTCTTTGGAGGGTGCGCTCTTGGCAGCGGCACTCCCACTCCATCCGTGGGCGCGCAGCACACGCGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCATCGCGGCGACCACTGCTGGGACAGCTTGTCCCCGGTGACGCGAGACCAAGCACTTCTCTACTCTCAGGCGCAAGGAGCAGCTGCGGCGCTCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTGAGGCGGCGCTGACTGGCGCTCGGAGGCTCGTGAGACCATCTTTTGGGTTCCAGGCGCTGGATGCCAGGACTCCCCGAGGTGCGCGCGCTGCGGCGGCTACTGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATGCGGCGCTGTTTCTGGAGTGTCTGGGAACACGCGAGTGCCCTACGCGGTGCTCTCAAGACGCACTGCGCGCTGCGAGCTGCGGTACCCCCAGCAGCGGCTGCTGTCGCGG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCGCGGCTCTGCGGCGCGCGGAGGAGGACACAGACCGCGCTGCGCTGGTGCAGTGTCTCCGCGAGCACAGCAGCGCTGGCAGGTGTACGGCTTCGTGCGGCGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTCCCCAGGCTCTGGGCTCCAGGCACAACGAGCGCTCTCAGGAACCAAGAGTTCTATCTCCCTGGGAAGCATGCAAGCTCTCGTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGGAAGATGAGCGTGGGAGCTGCGCTGGCTGCGCAGGAGCGCGGGTGGCTGTGTTCCGCGCGCAGAGCACCGTCTGCGTGAGGAGATCTGGCCAAGTCTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGCTGCTGAGCTGCTCAGGCTTTCTTTATGTACGGAGACCGTTTCAAAAGAACAGGCTCTTTTCTACCGAAGAGTGTCTGGAGCAAGTTGCAAGCATTTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F P Y R K S V W S K L Q S I G

AAT - - NNN - - GACAGTACACAGGGGGTTGACCGCGGACTGGCGCTCCCGAGGTTGACTATAGGACAGGTGTCCAGGTGCCCTGCAAGTAGAGGGGCTCTCAGAGGCGCTGCGGCTG
CATGGGTGGAGTGGCCCCGGGCATGGCTTCTGCTGTGCTGCCGTGGGTGCCCTGAGCCCTCACTGAGTGGTGGGGCTTGTGGCTTCCCGTGAGCTTCCCGCTAGTCTGTGTGCTG
GCTGAGCAAGCCTCTGAGGGGCTCTCTATTG...

FIG. 11A



Truncated protein 1

ATGCCGCGCGCTCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCCGAGCCACTACCGGAGGTGCTGCCGCTGGCCACGTTCTGT
M P R A P R C R A V R S L L R S H R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGCTGGTGACGCGGGGACCCGCGGCTTTCCGCGCTGGTGCCAGTGCTGGTGTGGCTGCCCTGGGACGACGCGCGCCCCCGCGCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCTCTCTCCGCGAGGTGCTGCTGCTGAAGGAGCTGGTGGCCGAGTGCTGAGAGGCTGTGCGAGCGCGCGGCGAAGAACGTGCTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G P A L L D G A R

CGGGGGCCCCCGAGGGCTTCACCACGCGTGGCAGCTACCTGCCCAACACAGGTGACCGCACTGCGGGGAGCGGGGCTGGGGCTGCTGCTGCCGCGCTGGGGCGACGAGCT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTACCTGCTGGCAGCTGCCGCTCTTTGTGCTGGTCCAGCTGCGCTACAGGTGTGGGGCGCGCGCTGTACCAGCTCGGCGCTGCCACTCAGGCCCGCGCCCCCGCG
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACAGCTAGTGGACCCGAAGGCGCTGGGATGCGAAGCGGCTGGAACCATAGCGTCAGGAGCGCGGGTCCCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTCGCTGCGCAAGAGGCCAGGCGTGGCGCTGCCCTGAGCGGAGCGGACGCCCTTGGGAGGGGCTCGGGCCACCGCGGAGGAGCGCTGGAACGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGTGTGTGCTGCTGCGAGCCCGCGGAAGCCACCTCTTTGGAGGGTGGCTCTCTGCGACGCGCCACTCCACCCATCGTGGGGCGCGAGCACCGCGGGCCCCCG
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCATCCTCGGCGCCACGCTCCCTGGGACAGCGCTGTCCCCCGGTGTACGCGGAGACCAAGCACTTCTCTACTCTCAGCGACCAAGGAGCAGCTCGGCGCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCCAGCTGCTGCGCTCGGAGGCTCGTGAGACCATCTTTCTGGGTTCCAGGCCCTGGATGCCAGGAGCTCCCGCGAGTTGCCCGCTGCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGCGCCCTGTTTCTGAGCTGCTTGGAAACACGCGCAGTGCCCTACCGGGTGTCTCTCAAGACGCACTGCCCGCTGCGAGCTGCGGTACCCACGAGCGGCTGTGTGCGCG
M R P L P L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTCTGTGGCGCCCCGAGGAGGAGGACACAGACCCCGCTCGCTGGTGACGTGCTCCGCGACACAGCAGCCCTGGCAGGTGTACGGCTTCGTGCGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGCTGGTGGCCCCAGGCTCTGGGGCTCCAGGCAACGAACGCGCTCTCTCAGGAACACCAAGAGTTCTCTCCCTGGGGAAGCATGCCAAGCTCTCGTGCAGGAGCT
L R R L V P P G L W G S R H N E R R P L R N T K K F I S L G K H A K L S L Q E L

GACGTGGAAGATGAGCTGCGGAGCTGCGCTTGGCTGCGCAGGAGCCAGGGGTGGCTGTGTTCGCGCGCAGAGCACCGCTGCGTGAGGAGATCCTGGCCAAGTTCTGCTGCTGCTGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGTGCTGAGCTGCTCAGGTCTTTCTTTATGTACGAGGACCAAGTTTCAAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

AATCAGACAGCACTTGAAGAGGGTGACGTGCGGGAGCTGTGGAAGCAGAGGTGAGGCAGCATCGGAAGCCAGGCCCGCTGCTGACGTCCAGACTCCGCTTCATCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

GTGGCTGTGCTTTGGTTTAACTTCCTTTTAAACAGAA
V A V L W F T F L F N Q K

CGGGCTGCGCGGATTGTGAACATGGAATACGTGCTGGGAGCCAGAACGTTCCGAGAGAAAAGAGGCGGAGCGTCTCACCTCGAGGGTGAAGGCACTGTTACGCTGCTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R P S V S F R G *

FIG. 11B

FIG. 11J

N-terminal^{domain} truncated telomerase (ver. 2)

ATGCGCCGCGCTCCCGCGTCCGAGCGCGGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAGTGGCTGCCGCTGGCCACGAGCTTCGCTG
M P R A P R P R C R A V R S L L R S H 3 R E V L P L A T F V

CGGCGCCTGGGGCCCCAGGGCTGGCGGCTGGTGAGCGGGGACCCGCGCGCTTTCCGCGCGCTGGTGCCCACTGCCTGGTGTGCGCTGGCCCTGGGACGCACGGCCCGCCCCCGCCG
R R L G P Q G W R L V Q R G G D P A A F R A L V C G L V C V P W D A R C P P P A A C

GGCCTCCCCGGGGTCCGCGTCCGGCTGGGGTTGAGGGCGCGCGGGGGAACAGCGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCCCGCAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R P P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L A L P P Q V

CCCCCTCTTCCGCGAGGTGTCTCGCTGAAGGAGCTGGTGGCCGAGTGTCTGCAGAGGCTGTGCGAGCGCGCGCGGAAGAACGTGCTGGCCTTCGGCTTCGCGCTGCTGGACGGGGCCCCG
P S F R G V S S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCCACAGCGTGCAGCTACTCTGCCAAACAGGTGACCGAGCTGCGGGGAGCGGGGCGTGGGGGCTGCTGCTGCGCGCGCTGGGCGACGACGT
G G P P E A F T T S V R S Y L L P N T V T D A L R G S G A W L L L R R V G D D V

GCTGGTTCACTGCTGGCAGCTGCGCGCTCTTTGTGCTGGTGGCTCCAGCTGCGCCTACCAAGTGTGCGGGCGCGCTGTACCAAGCTCGGCGCTGCCACTCAGGCCCGGGCCCCCGCC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGAACCCGAAGCGSTCTGGAGTGCAACGGCGCTGGAACCATAGCGTCAGGAGGCGCGGGTCCCCCTGGGCGTGCAGCCCCGGGTGCGAGGAGGCGCGGGGCGAGTGC
H A S G P R R R L L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCCGAAGTCTCGCGTTGCCAAGGRCGCCAGGCGTGGCGCTGCCCTGAGCCGGAAGCGGACGCCCTGTGGGCGAGGGTCTGGGCCACCACCGGGCAGGACCGGTGGACCGTGAACCG
S R S L P L P K R G A P P E R T P V G G S W A H P G R T R G P S F L S

TGGTTCTGTGTGGTGTCACTGCCAGACCCCGGAAGAAGCCACTCTTTGGAGGGTGGCGCTCTTGGCAGCGCCACTCCCAACCCTACCGTGGGCGCGCAGCACCAAGCGGGCCCCCG
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACCAAGTCCCTGGGACAGCGCTTGTCCCCCGGTGTACGCGGAGCAAGCACTTCTCTACTCTCAGGCGCAAGGAGCAGCTGCGGCCCTCTCTCTACTCAG
S T S T R A G P P R A P T D D T P C P V Y A E T K H F L C Y G S W A H P G R T R G P S F L S

CTCTGTAGGCCCCAGCTGACTGGCTCGGTGGAGCACTCTTTGGGTTCCAGGCCCTGGATGCCAGGACTCCCCGAGGTGCCCCGCGCTGCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGCCCCGTGTTCTGGAGCTGCTTGGGAACCAAGCGAGTGCCTTACGGGGTGTCTTCAAGACGCACTGCCCGCTGGAGCTGCGGTACCCCGAGCAGCGGTGTCTGTGCCG
M R P L F L F L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTCTGTGCGGCGCCCGAGGAGGAGCAGACAGCCCGCTGGCTGGTGCACTGCTCCGCGAGCAGCAGCCCTGGCAGGTGTACGGCTCTGTGCGGGCTGTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTGGCCCCAGGCTCTGGGGCTCAGGCACAACGAAGCGCGCTTCTCAGGAACCAAGAAGTTTCTCTCCCTGGGGAAGCATGCCAAGCTCTCGCTGCAGGAGCT
L R R L V P P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGGAAGATGAGCGTGGCGAGTGCCTTGGCTGCGCAGGAGCCAGGGGTGGCTGTGTTCGCGCGCAGAGCACCGTCTGCGTGAGGAGATCTTGGCAAGTCTCTGCTGCGGT
T W K T M S V R D C A A A S T S P G V G C V P A A E H R L R E I L A K F L H W L

GATGAGTGTGTACGCTCGTGCAGTCTCTAGTCTTCTTTATGTGACGGAGCAAGCTTTCAAAGAAGCAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAGCATTTGG
M A G S V Y V V E L L R S F F Y V T E T F Q K N R L F F Y R K S V W S K L Q S I G

AAT - NNN - -GACAGTCAACAGGGGGGTGACCGCGGAGCTGGGCGTCCCCAGGGTGTACTATAGGACAGGTGTCCAGGTGCCCTGCAAGTAGAGGGGCTCTCAGAGGCGTCTGGCTGG

CATGGTGGACGTGGCCCCGGGACATGGCCTTCTGCGTGTGCTGCCGTGGGTGCCCTGAGCCCTCACTGAGTCCGTTGGGGCTGTGGCTTCCCGTAGCTTCCCCCTAGTCTGTGTCTG

GCTGAGCAAGCCTCTGAGGGGCTCTCTATTG_

FIG. 11L



Truncated protein 1 (ver. 2)

ATGCCGCGCGCTCCCGCTGCCGAGCCGTCGCTCCCTGCTGCGCAGCCACTACCGGAGGTGCTGCCGCTGGCCACGTTGCTG
M P R A P R C R A V R S L L R S H R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGACGCGGGGACCGCGGCTTTCCGCGCGCTGGTGGCCAGTGCTGGTGGCTGGCCCTGGGACGACGCGCGCCCCCGCGCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCTCCCCGGGTGCGGCTCGGCTGGGTTGAGGGCGCGGGGGGAACAGCGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCCCGCAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCCCTCTTCCGCCAGGTGCTGCTGAAGGAGCTGGTGGCCGAGTGCTGACAGAGGCTGTGACGCGCGCGCGAAGAACGTGCTGGCTTCCGGCTTCCGCTGCTGGACGGGGCCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCAACAGCGTGGCGAGCTACCTGCCCAACAGGTGACCGACGCACTGCGGGGAGCGGGGCGTGGGGGCTGCTGCTGCGCCGCTGGGGCAGCAGCTG
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R R V G D D V

GCTGGTTACCTGCTGGCAGCTGCGCGCTCTTGTGCTGGTGGCTCCAGCTGCGCTACCAAGTGTGCGGGCGCGCGCTGTACCACTGCGCGCTGCCACTCAGGCCCGCCCCCGCC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCCGAAGGCGCTGGGATGCGAAGCGGCTGGAACATAGCGTCAGGGAGCGCGGGTCCCTTGGGCTGCCAGCCCCGGGTGCGAGGAGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTGCGTGGCCAAAGAGCGCAGGCTGGCGCTGCCCTGAGCGGAGCGAGCGCGCTTGGGAGGGGTCTGGGCCACCGGGCAGGACGCGTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGTGGTGCACCTGCCAGACCCGCGAAGAGCCACCTCTTTGGAGGGTGGCTCTCTGCGCAGCGCCACTCCACCCATCCGTGGGCCCGCAGCACCACGGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACCACTGCTGGGACACGCTTGTCCCCGGTGTACGCGGAGCAAGCACTTCTCTACTCTCAGGCGCAAGGAGCAGCTGCGGCCCTCTCTACTCAG
S T S R P P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCCACGCTGACTGGCGCTCGGAGGCTCGTGGAGACCATCTTTCTGGGTTCCAGGCCCTGGATGCCAGGACTCCCCGAGGTGCCCCGCTGCCCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGGCCCTGTTTCTGAGCTGCTTGGGAACACGCGCAGTGCCCTACGGGGTGTCTCTCAAGACGCACTGCCCGCTGCGAGCTGCGGTACCCACAGCAGCGGTGTGTGCCCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCGAGGCTCTGTGCGGCCCGGAGGAGGACACAGACCCCGTGGCTGGTGCAGCTGCTCCGCCAGCACAGCAGCCCTGGCAGGTGTACGGCTTCTGCGGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTGGCCCCAGGCTTGGGGTCCAGGCACAACGAACGCGCTTCTCAGGAACACCAAGATTCATCTCCCTGGGAAGCATGCCAAGCTCTGCTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGGAAGATGAGCGTGGGACTGCGCTTGGTGGCGAGGAGCCAGGGTGGCTGTGTTCCGGCGCAGAGCACGCTGCTGAGGAGATCCTGGCCAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

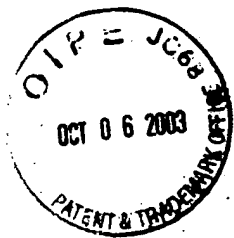
GATGAGTGTGACGCTGCTGAGCTGCTCAGGTCTTTCTTTATGTACGAGAGCACGTTTCAAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L P F Y R K S V W S K L Q S I G

AATCAGACGCACTTGAAGAGGGTGCAGCTGCGGGAGCTGCGGAAGCAGAGGTGAGCAGCATCGGAAGCCAGGCCCCCTGCTGACGTCCAGACTCCGCTTCATCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

GTGGCTGCTTTGGTTTAACTTCTTTTAAACCAGAA
V A V L W F T F L F N Q K

CGGGCTGCGGCGGATTGTGAACATGGACTACGTGCTGGGAGCCAGAAGCTTCCGAGAGAAAGAGGGCGAGCGTCTCACCTCGAGGGTGAAGGCACTGTTACAGCGTCTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R P S V S F R G *

Truncated protein 2 (ver. 2)



Truncated protein 3 (ver. 2)

ATGCCGCGCGCTCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGGAGGTGCTGCCGCTGCCACGTTGCTG
M P R A P R C R A V R S L L R S H P E V L P L A T F V

CGGCGCTGGGGCCCGAGGCTGGCGGCTGGTGAGCGCGGGACCGGCGGCTTTCCGCGCGCTGGTGCCCACTGCTGGTGCGCTGGGACGACGCGCGCGCGCGCGCGCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCCTCCCGGGGTCGGCGTCCGGTGGGTTGAGGCGCGCGGGGGAACAGCGACATGCGGAGAGCAGCGCAGCGGACTCAGGCGCTTCCCGCGAGGT
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCCCTCTCCCGCAGGTGCTGCTGCTGAAGGAGCTGGTGGCGGAGTGTGACAGAGCTGTGCGCGCGCGCGGAGAGACGTGCTGGCTTCCGCTTCCGCTGCTGACGCGGGCGCG
P S F R Q V S C L K E L V L A R V L C E R G A K N V L A F G F A L L D G A R

CGGGGGCGCGCGGAGGCTTACACACAGCGTGGCGAGCTACCTGCCCAACACGCTGACCGACGACTGCGGGGAGCGGGGCTGGGGGCTGCTGCTGCGCGCGTGGCGACGAGCT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTACCTGCTGGCAGCTGCGCGCTCTTGTGCTGGTGGCTCCAGCTGCGGCTACAGGTGCGGGGCGCGCGCTGTACAGCTCGGGCTGCGCACTCAGGCGCGCGCGCGCGCG
G L P L L A R C A L F L V L A P S C A Y V C G P P L Y Q L G A A T Q A R P P P

ACAGCTAGTGACCCGAAAGCGCTCTGGGATGCGAAGCGGCTGGAACATAGCGTCAGGAGCGCGGGGCTCCCGCTGGGCTGCCAGCCCGGCTGCGAGGAGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTGCGCTGCGCAAGAGGCGCGAGGCTGGCGCTGCCCTGAGCGCGGAGCGCGCGCTGGGAGGGTCTGGGCGCACCGCGGAGCGCTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTCTGTGTGTGTACCTGCGCAGACCGCGGAAAGACCACTCTTTGGAGGTGCGCTCTCTGCGCAGCGCCACTCCCACTCATCGTGGGCGCGCAGCACCGCGCGCGCGCG
G C V V S P A R P A E E A T S L E G S T R H S H P S V G R G F V A P P

ATCCACATCGCGGCGACCACTGCTCCCTGGGACACGCTTGTCCCGCGGTGACCGGAGACCAAGCACTTCTCTACTCTCAGGCGACAGGAGCAGCTGCGGCGCTCTCTACTCAG
S T S R P P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCGCAGCTGACTGGCGCTCGGAGGCTCGTGAGACCATCTTCTGGGTTCAGGCGCTGGATGCGCAGGACTCCCGCAGGTTGCGCGCGCTGCGCGCGCTGCTGCGA
C T L R P S P T A R P A E E I F L G S R P W M P G T P R R L P R L P R L V W Q

AATGCGCGCGCTGTTCTGAGCTGCTTGGGAACACGCGCAGTGCCTTACGGGTGCTCTCAAGACGCACTGCGCGCTGCGAGCTGCGGTACCGCAGCAGCGGTGCTGTGCGCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCGAGGCTCTGTGGCGCGCGCGAGGAGGACACAGACCGCGCTGCGCTGCTGCGCAGCAGCAGCGCGCTGGCAGGTGACGCTCTGTGCGGCGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGCGCTGTTGCGCGCGCGCTGCGGCTCCAGGACCAAGACCGCGCTTCTCAGGAACCAAGAGTTCATCTCCCTGGGGAAGCATGCGCAAGCTCTGCTGCGCAGGCT
L R R P P G L L G A S V L E G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

GACGTGGAAGATGAGCGTGGGAGCTGCGCTGGCTGCGCAGGAGCCAGGGGTGGCTGTTTCCGGCGCAGAGCAGCGCTGCGTGAGGAGATCTGGCAAGTCTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGACGCTGCTGAGCTGCTCAGGTCTTTCTTTATGTCAGGAGACCAAGTTCCTTCAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGAGCAAGTTGCAAGCATTGG
S V Y V V E L L R S F F Y V T E T T F Q K N R L F P Y R K S V W S K L Y S I G

AATCAGACAGCACTTGAAGAGGTGACGTGCGGGAGCTGTCGGAAGCAGAGGTGAGGAGCATCGGGAAGCAGGCGCGCTGCTGACGTCCAGACTCCGCTTCATCCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

CGGCGTGGCGCGGATTGTGAACATGGAATACGTGCTGGGAGCAGAACGTTCCGAGAGAAAGAGGGCGAGCGCTCTACCTCGAGGGTGAAGGCACTGTTACGCTGCTCAACTACGA
G L R P I V N M D Y V V G A R T P R R E K R A E R L T S R V K A L F S V L N Y E

CGGGCGCGCGCGCGCGCTCTGCGCGCGCTGCTGCTGGCGCTGGACGATATCCACAGGCGCTGGCGCACCTTCTGCTGCGGTGCGGGCGCGAGGACCGCGCGCTGAGCTGACTT
R A R R P P G L L G A S V L E G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTCAAGTGGATGTGACGGCGCGTACGACACCATCCCCAGGACAGGCTCAGCGAGGTGATCGCGCAGCATCAAAACCCAGAACAGTACTGCGTGGTGGTATGCGGTGCTGCA
V K V D V T G A Y D T I P Q D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q

GAAGGCGCGCGCATGGGCACTGCGCAAGGCTTCAAGAGCCAGTCTCTACCTTGACAGACCTCCAGCGGTACATGCGACAGTTCGTGGCTCACCTGCAGGAGACGAGCGCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCGCTGCTGATGAGCAGAGCTCTCCCTGAATGAGGCGAGGCTGCGCTCTGACGCTCTCTACGCTTCAATGTGCCACACGCGGTGCGCATCAGGGGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGGATCCCGAGGCTCATCTCTCCAGCTGCTGTCAGCGCTGTGTCACGGCGACATGAGAGAACAGTGTGCGGGGATTCGGCGGGACGGGCTGCTCTGCGTGTGGTGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTGTTGGTGACACCTCACCTCACCCAGCGAAACCTTCTCAGGACCTGCTGCGAGGTGCTCCCTGAGTATGGCTGCGTGGTGAACCTTGGGAAGACAGTGGTGAACCTTCC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGACGAGGCGCTGGGTGGCAGCGCTTTGTTGAGATGCCGCGCGCGCTATTCCTCTGTTGCGGCTGCTGCTGGATACCGGACCGCTGGAGTGCAGAGGACTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S R

GTGAGCGCACTGGCGGAAAGTGAGCGCTGTGCCCGCTGGGCGAGGTGCTGCTGACAGGCGCTTGGCTCCACTCTGCTTCCGTGTTGGGCGAGGCGACTGCCAATCCCAAGGGTCAGA
*

TGCCACAGGGTGGCGCTGCTCCACTGTCGGGCTGAGCACAATGCATCTTTCTGTTGGAGTGAGGTTGCCTCACACGGGAGCAGTTTCTGTGCTATTTTGGTAA.....

FIG. 11R



Altered C-terminus protein (ver. 2)

ATGCCGCGCTCCCGCTGCCGAGCGTGGCTCCCTGCTGCGCAGCCACTACCGGAGGTGCTGCCGCTGGCCAGCTTCGTG
M P R A P R C R A V R S L L R S H A R E V L P L A T F V

CGGCGCTGGGCCCCAGGGCTGGCGGCTGGTCAGCGCGGGACCGCGGCTTTCCGCGCGTGGTGGCCAGTGCTGGTGGCTGGGACGACGCGCGCCCCCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCTCCCGGGGTGGCGTCCGGCTGGGGTTGAGGGCGCGCGGGGAACCGAGCATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCGCGAGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCCCTCTCCCGCAGGTGCTGCTGCTGAAGGAGCTGGTGGCCGAGTGTGACAGAGGCTGTGCGAGCGCGCGGAAGAACGTGCTGGCCTTCGGCTTCGCGCTGTGAGCGGGGCGC
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGCCCCCGAGGCGCTTACCAACAGCGTGGCGAGCTACCTGCCCAACCGGTGACCGACGACTGCGGGGAGCGGGCGTGGGGGTGCTGCTGCGCCGCTGGCGGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTACCTGCTGGCAGCTGCGCGCTCTTTGCTGGTGGCTCCAGCTGCGCTACAGGTGTGCGGGCGCGCTGTACAGCTCGGCGCTGCCACTCAGGCCCGCGCCCCGCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACCTAGTGACCCCGAAGCGCTGGGAGTGCAGCGGCTGGAACATAGCGTCAGGAGGCGGGGCTCCCTGGGCTGCCAGCCCGGGTGGCAGGAGGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTGCGCTTGCAGAGGCGCGCGCTGCCCTGAGCGGAGCGGACCGCGTGGGAGGCGTGGGCGCCACCGGGCAGGACGCGTGGACCGAGTGACCG
S R S L P L P K R P R R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGGTGTCACTGCCAGACCGCGGAAGACCACTCTTTGGAGGGTGGCTCTCTGGCAGCGCCACTCCACCCATCGTGGGCGCGCAGCACCGCGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACCGTCCCTGGGACACGCTTGTCCCCGGTGTACCGGAGACCAAGCACTTCTCTACTCTCAGGCGCAAGGAGCAGCTGCGGCCCTCTCTACTCAG
S T S R P P P V Y A E T P C R P L Y S S G D K E Q L R R R V G D D V

CTCTGAGGCGCCAGCTGACTGGCGCTCGGAGGCTCGTGGAGCATCTTTTGGGTTCAGGCGCTGGATGCCAGGACTCCCCGAGGTTCGCCGCTGCCCGCAGCGTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATGGCGCGCTGTTCTGGAGTGTCTGGGAACACGCGCAGTGCCTTACGAGGCTCTCAAGACGACTGCCCGTGGAGCTGCGGTACCCGAGCAGCGGTGTCTGTGCGCG
M R P L P L E L L G N H A Q C P Y G L T H C P L R A A V T P A A G V C A

GGAGAAGCCCGAGGCTCTGTGGCGCGCGCGGAGGACACAGACCCCGTGGCTGGTGGCTGCTGGCAGCAGCAGCGCTGGCAGGTGTACGCTTCTGTGGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGCGTGGTCCCCCGAGGCTCTGGGGTCCAGGCACAAAGCGCGCTCTCTCAGGAACACCAAGAGTTCATCTCCCTGGGAGCATGCCAAGCTCTCGTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGAAGATGAGCGTGGCGGACTGCGCTGGCTGCGCAGGACCCAGGGTGGCTGTGTCGGCGCGAGGACCGCTGCGTGAGGAGATCCTGGCAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A F L H W L

GATGAGTGTGACGTGCTGAGCTGCTCAGGTCTTTTATGTACGAGACCAAGTTCCTCAAGAACAGGCTCTTTTCTACCGAAGAGTGTCTGGAGCAAGTGTCAAGACATGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

AATCAGACGACTGAAGAGGTGACGTGCGGGAGCTGTGGAAGCAGAGTTCAGGACGATCGGAAGCAGGCGCGCGCTGCTGACGCTCAGACTCCGCTTCATCCCAAGCCTGA
I R Q H G K R V Q L R E L S E A E V R E A R P A L L T S R L R L F L H W L

CGGGCTCGGCGGATGTGAACATGACTACGTGCGGAGCAGAACGTTCCGAGAGAAAGAGGCGGAGCGTCTACCTCGAGGCTGAAGGACTGTTACGCTGCTCAACTACGA
G L R P I V N M D Y V V G A R T P R R E K R A E R L T S R V K A L F S V L N Y E

CGGGCGCGCGCGCGCGCTCTGGGCGCTCTGTGCTGGGCTGGAGATATCCAGGCGCTGGCGCACCTTCGTGCTGCTGCTGGGCGCGAGGACCGCGCTGAGCTGACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTCAAGTGGATGTGACGGCGCGTACGACACCATCCCCAGGACAGGCTCAGGAGGTATCGCCAGCATCATAAACCCAGAACAGTACTGCGTGGCTGCGTATCGGTGGTCCA
V K V D V T G A Y D T I P Q D R L T E V I A S I I K P Q N T Y C V R R Y I P K W Q

GAAGGCGCGCATGGGACGCTCGCAAGGCTTCAAGAGCCAGCTCTACCTTGACAGACCTCCAGCGGTACATGCGAGTTCGTGGCTCACCTGAGGAGACAGCGCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCCGTGCTACGAGCAGAGCTCCCTCGAATGAGCCAGCAGTGGCTCTTCGAGCTTCTCAGCTTTCATGTCACCAACGCGCTGCGCATCAGGGCAAGTCTTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGATCCCGAGGCTCATCTCTCCAGCTGCTGTCAGCTGTGCTACGGGACATGGAGAACAGCTGTTTGGGGATTGCGCGGGACGGGCTGCTCTCGGTGTTGGTGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTGTTGGTGACACTCACCTCACCCAGCGAAACCTTCTCAGGACCTGGTCCGAGGTGCTCCCTGAGTATGGCTGCGTGGTGAACCTTGGGAGACAGTGGTGAACCTCC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGAGGAGGCGCTGGGTGGCAGCGCTTTGTTGAGATGCGGCGGCGGCTATTCCTCTGGTGGCGCTGCTGCTGATACCGGACCTGGAGTGCAGAGCAGTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S S

CTATGCCGCGACCTCCATCAGAGCCAGTCTCACTTCAACCGCGCTTCAAGCTGGGAGGAACATGCGTCGCAAACTCTTTGGGGCTTGGCGCTGAAGTGTACAGCCTGTTTCTGGA
Y A R T S I R A S L T F N R G F K A G R N M R R K L F G V L R L K C H S L F L D

TTTGAGGTGAACAGCCTCAGACGCTGTCACCAACATCTACAAGATCTCTGCTGACGCGGTACAGGTTTACGATGTGTGCTGACGCTCCCATTTTCATCAGCAAGTTTGAAGAA
L Q V N S L Q T V C T N I Y K I L L L Q A Y R F H A C V L Q L P F H Q Q V W K N

CCCCAATTTTCTGCGGCTCATCTCTGACACGCGCTCCCTGCTACTCCATCTGAAAGCCAAAGACGAGGATGCTGCTGGGGCCAAGGCGCGCGCGCTCTGCGCTCCGA
P T F F L R V I S D T A S L C Y S I L K A K N A E

CGAAGAAAACATTTCTGCTGACTCCTGCGGTGCTGGGTC
E E N I L V V T P A V L G S

GGGACAGCCAGAGATGGAGCCACCCCGAGACCGTGGGTGGTGGGAGCTTTCCGGTGTCTCTGGGAGGGAGTGGGCTGGGCTGTGACTCTCAGCCTCTGTTTCCCCCAG
G Q P E M E P P R R P S G V G S F P V S P G R G V G L G L *

FIG. 11S



CTATATATGAGTTTTTCAGTTTTGA

FIG. 11U

FIG. 11V

